

Department of Economics and Finance

Chair: Macroeconomics

**Effect of European Sovereign Debt Crisis on Banks' Performance and  
Consequences to General Economy**

**Summary**

Supervisor

Prof. Nicola Borri

Candidate: Artur Mendes

Student Reg. No. 645371

Co-Supervisor

Prof. Salvatore Nisticò

## **Abstract**

This paper studies the impact of the European sovereign debt crisis on Portuguese banks' share prices. I employ an event study methodology to assess the behavior of banks' share prices before, and after a credit rating announcement in relation to both the sovereign and the banks individually. I find that sovereign credit ratings have a significant impact on banks' stock market returns while individual bank credit ratings seem to have little influence. This is probably due to the fact that banks' credit ratings have been reflecting changes in sovereign ratings rather than any idiosyncratic factors of banks' solvency. Among the rating agencies studied the most predominant is Standard & Poor's. Furthermore, I find that the behavior of banks' stock returns exhibit a certain degree of market inefficiency and anticipation.

*Key words:* European sovereign debt crisis, banks' share return, event study, market efficiency.

## 1. Introduction

Financial stability risks have increased<sup>1</sup> substantially over the past two years due to the burst of the so-called European sovereign-debt crisis. It all began when doubts about the Greek government ability to honor their debts maturing in 2010 made credit rating agencies review the rating notation of several countries pressuring government bonds' yields to increase drastically. Ever since some European countries with special focus on those known as peripheral countries – Ireland, Portugal, Spain, and Italy – were thrown to the spotlight of the protracted crisis, which began with the late 2000s financial crisis.

In the aftermath of this first stage of the crisis – predominantly financial - and with the economies slowing as a result of tightened credit and decreasing international trade, governments all over the world were forced to take on unprecedented fiscal stimulus, expansionary monetary policy and tremendous institutional bailouts for those considered “too big to fail”.

Among the main recipients of those spectacular rescue packages were banks, which were re-capitalized at a global scale so as to stave off the banking crisis instigated by the international financial crisis started in 2007. It worked but only to postpone it as most of the money banks received from governments was without delay to the safest place banks could find in the pandemonium of the financial crisis – the so-thought haven of government debt.

As a consequence of the spectacular fiscal efforts, bailouts, and subsequent recession public finances across advanced economies suffered a sharp deterioration, raising concerns regarding the sovereign risk for those who already had weak debt positions. Acknowledging the weak fiscal position of some euro area countries credit rating agencies started reviewing the sovereign credit ratings, especially that of peripheral countries. As a result of the concerns/downgrades, the financing costs for countries with poor fiscal balances rose immensely leaving Greece (May 2010), Ireland (November 2010), and Portugal (May 2011) no choice but default or ask for external help in order to meet their financing needs at a reasonable and viable cost.

With banks facing such difficulties hovers in the air the possibility of a credit shrinkage, which would probably trap the forsaken real economy in a downward spiral as argued in several studies<sup>2</sup>.

Given that this is an issue of utmost importance it is imperative to study the impacts that a sovereign debt crisis can have first on banks, and consequently on the general economy. In the scope of this paper I study solely the impact on banks but the contagion to the main street is certainly a problem worthy of further research. Also, because government debt crisis are not common in developed countries, the literature studying the importance of credit rating agencies announcements on the latter countries is limited, which makes studies on this subject even more significant. This paper tries to provide a better understanding on how has the sovereign-debt crisis affected banks, in particular Portuguese banks listed on the main Portuguese stock index – PSI20.

The remainder of this paper is organized as follows: section two starts the empirical analysis using a rather more descriptive approach. Sections three continues the empirical study using a more analytical and sophisticated approach – event study. The relevant results are offered in the final of each section. Finally, section four encloses the main conclusions. For more detailed elucidation please refer to the extended version of the paper.

---

<sup>1</sup> Source: IMF, September 2011 issue of the Global Financial Stability Report

<sup>2</sup> Notably, Bernanke (1983) in one of his famous studies about the Great Depression argues that the credit squeeze helped transforming the severe but not unprecedented downturn of 1929-30 into the most severe recession of the 20<sup>th</sup> century.

## 2. Preliminary Analysis

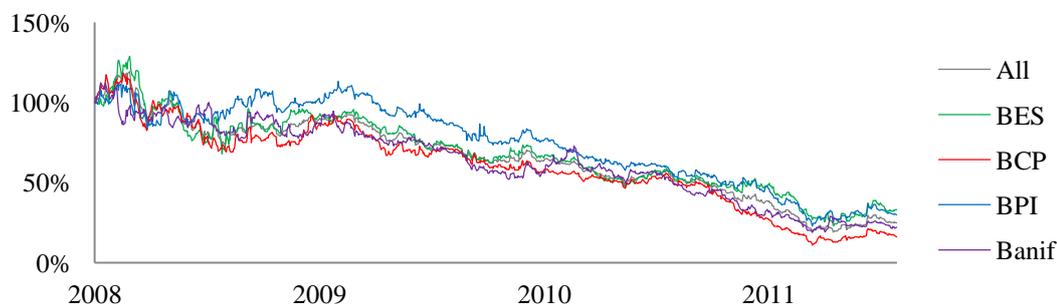
To begin the analysis on how sovereign ratings have affected banks I compare the performance of the banking industry with that of the non-banking industry from a few months before the beginning of the sovereign-debt crisis up until March 2012. For this purpose I consider that the crisis started in January 2009 when the sovereign credit rating for Portugal was first downgraded. Not by chance, the period leading up to the first downgrade was one of tremendous turmoil. That fact might distort what I am trying to assess – that the sovereign debt crisis, notwithstanding affecting the economy on the whole affects banks more severely.

To do this comparison between banks' and the rest of the economy I used two series of daily data from Datastream – one that aggregates the entire Portuguese banking system (Portugal – DS Banks) and other, which encompasses all other industries except banks (Portugal – DS Non-Financial). Moreover, I compare individually the performance of the four publicly traded Portuguese banks against the same non-financial index (henceforth NFI).

In order to carry out this approach I compute the ratio<sup>3</sup> between each bank share value to the NFI value and set the value for September, 2008 equal to 100%. Despite the simplicity of this approach, it is useful to grasp the relative performance of banks relatively to other industries. More sophisticated approaches will be developed later on.

Results (Graph 1) demonstrate clearly that, Portuguese banks' share prices have underperformed greatly the NFI. For instance, the banking industry on the whole presents a ratio of 25% in March 2012. Individually the best performer during the scrutinized period was Banco Espírito Santo (BES) but its ratio against the NFI went from 100% in the beginning of September 2008 to 33% as of the beginning of March 2012. On the other hand, Banco Comercial Português (BCP) was the one having the worst performance – as of March 2012 the ratio was of 16,2%. These figures indeed suggest that the sovereign debt crisis has been having a tremendous impact on the banks' share prices in relation to the other industries. BPI and Banif exhibit a ratio of 30% and 22% respectively.

Moreover, one can observe from Graph 1 that following the natural distress caused by the failure of Lehman Brothers in the end of 2008 banks recover modestly until concerns about the creditworthiness of sovereigns started increasing (second half of '09). Lately, since late 2011/early 2012, banks started recovering relatively to the non-financial part of the market, which signals that investors are easing the pressure on Portuguese banks (government bonds' yields) as the so-called “programa de ajustamento” seems to be producing good enough results.



Graph 1 ratio of the banks' shares prices to the NFI. Daily data; 1 September 2008 = 100.

<sup>3</sup>  $\text{Ratio}_{i,t} = \text{Bank}_{i,t} \text{ Share Value} / \text{NFI}_t \text{ value}$ . This approach is borrowed from Paneta et al. (2011)

### 3. Empirical Study

#### 3.1.1 General Steps

Even if there is no strict methodology to conduct an event study, there is a widely accepted flow of analysis. After defining the events of interest, which on the ambit of this paper are the announcements by credit rating agencies, one has to decide upon the period over which security prices of relevant firms will be examined – this period is known as the event window.

For the sake of this paper and as stated previously the relevant firms are the Portuguese banks, explicitly those listed on the PSI 20. Moreover, the analysis uses a 5-day event window.

The event window is larger than the event of interest so as to permit the examination of periods surrounding the event. For instance, by considering an event window greater than solely the day in which the announcement is made, it is possible to study for market efficiency and anticipation, as it will be discussed below.

#### 3.1.2 The Concept of Abnormal Return and Normal Return Models

The appraisal of the event's impact entails a measure of the abnormal return. Just like in Fama et al. (1969) the abnormal return is defined as the actual ex post difference between the realized return of the firm and the “normal return” during the event window.

The normal return is defined as the expected return without conditioning on the event taking place. The abnormal return for firm  $i$  and event date  $t$  is specified as follows:

$$AR_{i,t} = r_{i,t} - E(r_{i,t}|X_t), \quad (1)$$

where  $AR_{i,t}$ ,  $r_{i,t}$ , and  $E(r_{i,t}|X_t)$  are the abnormal, realized, and normal returns respectively while  $X_t$  is the conditioning information for the normal return model.

A variety of normal return models have been proposed. The importance of such model lies on the fact that with greater r-squared the greater is the variance reduction and therefore the prediction will have more power. However, r-squared is not all, as with the increase of explanatory variables goes the increase in estimation error in a way that it's important to have a model offering a high r-squared while being at the same time parsimonious. The most purposeful models suggested in previous literature are: 1) mean-adjusted returns, (2) market model, (3) deviation from the Capital Asset Pricing Model (CAPM), or (4) deviations from the Arbitrage Pricing Theory (APT).

In this paper I use the so-called market model due to its simplicity, parsimoniously and the fact that gains arriving from employing multifactor models for event studies are limited (MacKinlay, 1997). Moreover, the implementation of statistical models such as the market model require the assumption that asset returns are independent and identically distributed through time, which while being strong assumptions, are empirically reasonable and inference using normal return models tend to be robust to deviations from assumptions.

### 3.1.3 Market Model

The market model is a statistical model in which the return of any given security is linked to that of a broad market portfolio. As refereed above, the statistical specification of the model is build upon the assumption of joint normality of assets returns and is as follows:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \varepsilon_i, \quad (2)$$

$$E[\varepsilon_{i,t}] = 0 \text{ and } Var(\varepsilon_{i,t}) = \sigma_{\varepsilon_i}^2, \quad (3) \ \& \ (4)$$

where  $r_{i,t}$  and  $r_{m,t}$  represent the period- $t$  return of bank  $i$  and of the market respectively, and  $\varepsilon_{i,t}$  is the zero mean disturbance error term.  $\alpha_i$ ,  $\beta_i$ , and  $\sigma_{\varepsilon_i}^2$  are the parameters of the model.

### 3.1.4 Distribution of Abnormal Returns

Given the model parameters one has then to measure and analyze the abnormal returns. The sample of daily abnormal returns is generated as follows:

$$\widehat{AR}_{i,t} = r_{i,t} - [\widehat{\alpha}_i + \widehat{\beta}_i r_{m,t}], \quad (5)$$

where  $\widehat{AR}_{i,t}$  represent the abnormal returns estimated by using the market model. Under the null hypothesis, conditional on the event window market returns, the abnormal returns will be jointly normally distributed with a zero conditional mean and conditional variance  $\sigma^2(\widehat{AR}_{i,t})$  as presented below:

$$\sigma^2(\widehat{AR}_{i,t}) = \sigma_{\varepsilon_i}^2 + \frac{1}{L_1} \left[ 1 + \frac{(r_{m,t} - \widehat{\mu}_m)^2}{\widehat{\sigma}_m^2} \right], \quad (6)$$

where  $\widehat{\mu}_m$  is the average return of the market during the estimation period, and  $\widehat{\sigma}_m^2$  the variance of returns during the same period. The second component is due to sampling error and leads to serial correlation of abnormal returns. This problem is solved easily as in practice the length of the estimation window can be chosen to be large enough so that the second component of the right-hand side of (6) goes to zero. In fact, by using an estimation window as explained above its secure to ignore it - the variance of the abnormal returns will be solely  $\sigma_{\varepsilon_i}^2$ . After having estimated the abnormal returns and in order to assess the significance of the event it is paramount to make use of the distribution of abnormal returns, which under the null hypothesis - that the event has no impact on the behavior of returns - is:

$$\widehat{AR}_{i,t} \sim N \left( 0, \sigma^2(\widehat{AR}_{i,t}) \right). \quad (7)$$

### 3.1.5 Aggregation of Abnormal Returns

Furthermore and in order to accommodate for multiple period event window one has to aggregate the abnormal returns observations. The concept used for such aggregation is again the same used by Fama et al. (1969) - the cumulative abnormal return (CAR). For an event window going from  $\tau_1$  to  $\tau_2$  the sample cumulative abnormal return is the sum of included abnormal returns:

$$\overline{CAR}_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} \widehat{AR}_{i,\tau}. \quad (8)$$

Moreover, and as in the variance of abnormal return in (6), asymptotically (with large enough estimation window) the variance of  $\widehat{CAR}_i$  is defined as:

$$\sigma_i^2(\tau_1, \tau_2) = (\tau_2 - \tau_1 + 1)\sigma_{\varepsilon_{i,t}}^2. \quad (9)$$

The distribution of the cumulative abnormal return under the null hypothesis is then:

$$\widehat{CAR}_i(\tau_1, \tau_2) \sim N\left(0, \sigma_i^2(\tau_1, \tau_2)\right). \quad (10)$$

### 3.1.6 Estimation of the Variance and $t$ -test

In practice, because  $\sigma_{\varepsilon_{i,t}}^2$  is unknown, one must estimate the variance of the abnormal returns. The sample variance measure of  $\sigma_{\varepsilon_{i,t}}^2$  from the estimation window is a suitable choice. Given the distribution of (cumulative) abnormal returns under the null hypothesis, tests on the veracity of the latter can be conducted using the following  $t$ -ratio:

$$t - test = \frac{\widehat{CAR}_i(\tau_1, \tau_2)}{Var[\widehat{CAR}_i(\tau_1, \tau_2)]^{1/2}} \sim N(0,1). \quad (11)$$

The test above allows for studying the effect of the event of interest at an individual basis. In order to study the impact at an aggregate level (i.e. banking industry on the whole) banks' abnormal returns must be aggregated cross-sectionally; however, this is not possible as the assumption that the abnormal returns are independent across securities does not hold, due to the overlap of event windows. With the overlap the implicit assumption that covariances among securities are zero does not hold. This is often referred to as clustering.

### 3.1.7 Inferences with Clustering

There are two ways of handling the overlapping of the event window. One is to use a portfolio approach, case in which the security level analysis can be applied directly to the portfolio. The other is to analyze the impact at a security level. This second approach is most commonly used when there is total clustering and in spite of having little power and poor finite sample properties relatively to the first, has the advantage of accommodating for situations where some firms exhibit positive abnormal returns and some other negative abnormal returns.

In the scope of this work I perform both analyses. For that I use the same banking industry portfolio as in the preliminary analysis (Portugal – DS Banks).

### 3.1.8 Results

Applying the methodology explained above I study the significance of all announcements made by the pertinent rating agencies. Firstly, I estimate the 5-day CARs starting on the day of the announcement (8). Secondly, I ought to estimate the variance of the CARs, which is done using (9) after estimating the variance of the abnormal returns. Finally, with the 5-day CAR and respective standard deviation I apply the  $t$ -test (11). The appraisal of the  $t$ -test is standard.

Table 2 below presents a brief summary of the results obtained by employing this so-called “traditional” event study methodology. The events are treated individually, and divided into two groups - downgrades and outlook revisions – so as to grasp the impact of each set of events<sup>4</sup>. The upper part of the table sums up the impacts of sovereign related announcements whereas the inferior summarizes the effect of bank related announcements. I present the average CAR across all events as well as the percentage of significant events of each set of announcements (e.g. 1/5 means that 1 out of 5 was significant). For a more comprehensive understanding please refer to Appendix 2 where the results are presented in an extensive manner, event by event.

**Table 2 - Summary of Announcements' Effects**

<b>Sovereign Related Announcements</b>								
Bank	S&P		Fitch		Moody's		DBRS	
	Downgrade	Out.Rev	Downgrade	Out.Rev	Downgrade	Out.Rev	Downgrade	Out.Rev
<b>Banking Industry</b>								
%Significant Events	1/5	2/4	2/5*		0/3	0/2	2/2	
Average CAR	-0,41%	-4,34%	-1%		-1%	1%	-7%	
<b>Banif</b>								
%Significant Events	1/5	1/4**	1/5		0/3	0/2	1/2	
Average CAR	-2,83%	-0,82%	-4%		-1%	1%	-6,04%	
<b>BCP</b>				Not applicable <sup>+</sup>				Not applicable <sup>+</sup>
%Significant Events	2/5	1/4	2/5		1/3	1/2**	1/2	
Average CAR	-0,46%	-3,94%	-3%		-2%	1%	-6,06%	
<b>BES</b>								
%Significant Events	3/5*	3/4	3/5*		0/3	0/2	1/2	
Average CAR	-0,68%	-6,84%	-1%		-3%	1%	-6,12%	
<b>BPI</b>								
%Significant Events	0/5	1/4	1/5**		0/3	0/2	1/2	
Average CAR	-2,59%	-1,85%	1%		-2%	2%	-7,80%	
<b>Bank Level Announcements</b>								
	S&P		Fitch		Moody's		DBRS	
	Downgrade	Out.Rev	Downgrade	Out.Rev	Downgrade	Out.Rev	Downgrade	Out.Rev
<b>BCP</b>								
%Significant Events	1/4	1/3***	1/4**	0/1	0/5	2/4**	NA	
Average CAR	2,19%	-5,02%	0,16%	1,19%	-0,86%	2,10%		
<b>BES</b>								
%Significant Events	2/4*	0/2	NA		1/5**	2/4**	1/2	NA
Average CAR	3,07%	-5,43%			-0,80%	5,06%	-6,12%	
<b>BPI</b>								
%Significant Events	1/4**	0/2	0/4	0/1	1/4**	0/5***	NA	
Average CAR	-0,19%	-4,53%	2,89%	0,15%	1,99%	1,89%		

The threshold for an event to be considered significant is a p-value<10%; \*This percentage include cases where the CAR are significantly positive; \*\*Significant events arising from this set of events are only positive; \*\*\* one of this outlook revision is a positive one; 1/5 (#significant Events)/(#Total Events).

Source: Author Calculations

<sup>4</sup> For example, all the announcements of S&P regarding BES are considered a set of events.

From the results presented in table 1 it is observable that sovereign related announcements engendered, in general, negative CARs. Particularly, announcements from S&P and DBRS caused negative average CARs across all the analyzed securities.

Also, Fitch's announcements produced negative average CARs to all securities with the exception of BPI. In relation to Moody's, the results point out a clear division between downgrades and outlook revisions with the first producing negative average CARs across the board whereas the latter generated positive average CARs, also across the board.

Breaking the analysis into downgrades and outlook revisions from S&P one observes that with exception of Banif and BPI, outlook revisions have had more impact than downgrades themselves. In fact, sovereign outlook revisions by S&P are the set of events producing the most significant average CARs.

For instance, the Portuguese banking industry on the whole underperformed the broad market, on average, by 4,34% in the 5-days following a sovereign outlook revision against the 0,41% correspondent to the parallel underperformance after a downgrade. Individually, the most affected banks by sovereign outlook revision are BES and BCP, which exhibit an average CAR of -6,84% and -3,94% respectively, which again implies a huge difference from the CARs produced by downgrades (-0,68% and -0,46%).

On the other hand, for Banif and BPI, downgrades caused more impact than outlook revisions; however, the difference between the verified average CARs is not as significant as for the cases of BES and BCP.

Nevertheless the diverse effects experienced by each bank, the above observations seem to entail that outlook revision by S&P are taken by the market as truly new information and that somehow, markets participants anticipate the downgrade with the outlook revision. In fact, by looking at Appendix 1 (chronology of downgrades/outlook revisions since January '09) it is observable that S&P is sort of the leading rating agency in the sense it anticipates the other agencies (announcements by other rating agencies come consistently after the analogous one from S&P).

As a result of the previous and the fact that rating opinions are almost perfectly substitutes it is normal that announcements made by S&P create more significant CARs in relation to other rating agencies. This is also supported by the portion of significant events engendered by the various rating agencies - S&P has the biggest portion of significant events (excluding DBRS). Announcements coming from the newly appointed<sup>5</sup> DBRS are significant across the board and produced considerable negative average CAR, ranging from -6,04% for Banif to -7,80% to BPI. However, as the sample of DBRS announcement is really limited (four downgrades/two dates), it is difficult and imprudent to draw meaningful conclusions.

Furthermore, taking into consideration individual announcements it is again detected that outlook revisions from S&P caused considerable negative average CARs. However, and because usually rating agencies review their rating opinions for all the institutions around the same date (Portugal included) it is difficult if not impossible to assess the relative contribution of individual/sovereign outlook revision to the negative CARs observed. Regarding individual rating announcements from Fitch and Moody's there is no evidence of them generating systematic negative CARs. In relation to the significance of individual announcements I find it to be very low and more surprisingly, to cause at times positive and significant CARs. This last observation may be due to the market having worst expectations regarding the awaited announcements in comparison to what actually happened. (e.g. agency issues an outlook revision when a downgrade was expected)

---

<sup>5</sup> DBRS started issuing rating opinions on BES and Portugal in 2010

From these results there is evidence that markets value more sovereign than individual ratings, meaning that market participants seem to acknowledge, at the time of a sovereign related announcement, that sooner or later banks will receive the same treatment. This finding may be associated with the fact that banks' credit rating reviews have been reflecting changes in sovereign ratings rather than any idiosyncratic factors regarding banks' solvency.

Moreover, I find evidence that S&P is the predominant agency in the sense its announcements generate in general, more significant and negative CARs. Particularly, outlook revisions from S&P, probably as a result of being fresh information coming to the markets, generate the most remarkable negative average CARs.

Furthermore, it seems that, analogously to the relation between sovereign and individual ratings, market participants expect other rating agencies to announce something similar to that S&P has already announced. This seems to render announcements from rating agencies other than S&P rather "useless".

### 3.2 Regression Based Event Study

Additionally to the traditional event study methodology I also use regression based event study methodology to evaluate the impact of credit rating agencies' announcements on the return of banks' shares. In order to do so, I employ once again the market model to eliminate the effects of wide economic factors leaving the portion of return that is due to firm/country specific information. Then, by using a set of dummy variables that assume a value of 1 on the day of the downgrade it is possible to evaluate the impact of such an event in banks' performances as measured by their share prices movements. To complete the analysis I also include four lags of the dummy variable. The use of the five dummy variables is in a sense, the equivalent to have a 5-day event window and permits to study for market efficiency. This approach considers the significance of abnormal returns day-by-day, conversely to the "traditional" event study that solely studies the significance of the cumulative returns over the length of the event window. The regression estimated by using this approach is as follows:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \sum_{\tau=\tau_1}^{\tau_2} \gamma_{i,t} D_{\tau,t} + \varepsilon_i, \quad (12)$$

where  $D_{\tau,t}$  are dummy variables assuming value one on  $t = \tau$  and zero otherwise (e.g.  $D_{\tau,\tau_1}$  assumes value on the day of the announcement,  $D_{\tau,\tau_2}$  on the day after the announcement etc.) and  $\gamma_{i,t}$  are the correspondent coefficients. All the remaining variables and parameters remain unaltered from what is presented in (2). With this approach the coefficients on the dummy variable correspond precisely to the abnormal returns verified in that day. The regression is estimated by using the entire sample, from February '07 to January '12.

#### 3.2.1 Testing for anticipation

The analysis carried out so far aims at analyzing the reaction of banks' share prices after a credit rating announcement is made.

Analogously, it is unquestionably interesting to assess if the information contained in the announcements is somehow observed by the market even before the announcements are made. To test for this hypothesis I use the very same framework as above only with a simple adaptation - the inclusion of dummy variables that assume value one in the days preceding the announcement.

For this purpose I use five new dummy variables, one for each of the five days preceding the event. These five days are a very small period of time to make such analysis as if the fundamentals of a country/bank were to induce a downgrade, they would most likely be noticeable more than five days before the actual announcement. However, due to the high frequency of downgrades during the period analyzed, using a larger window so as to study for a possible anticipation phenomenon will most likely violate the independence required for conducting such a study.

### **3.2.2 Results**

Due to the length of the outputs generated by this regression based event study it is impossible to present the results here. However, in Table 3 below I try to sum up the results obtained. For a more comprehensive understanding please refer to Appendix 3 where the regressions' outputs are presented in an extensive manner.

The summary is made at three levels: significance (immediate impact), market inefficiency, and anticipation. The judgment of the three considered levels is made qualitatively through a very simplistic approach – either they are verified (“yes”) or not (“no”). For instance, in relation to the Portuguese banking industry on the whole (All), country level outlook revisions from S&P caused significant impact (“yes”); the adjustment of stock prices after the announcement exhibited signs of market inefficiency (“yes”); and finally, there were no signs of anticipation to the announcement (“no”). Again, I divide the analysis of into two groups – outlook revisions and downgrades.

I now comment briefly the results obtained, starting by the upper part of Table 2 – outlook revisions. Commencing from the significance of sovereign outlook revisions made by Standard & Poor's, there is evidence that it indeed produce significant negative abnormal returns to the banking industry in general, and to BES and BCP in particular.

As for market inefficiency I find significant abnormal returns on the days after the announcement for all the securities studied except of BPI, which indicate that the market is not efficient as it does not adjust entirely on the day in which the announcement is made.

Regarding the anticipation, I find no significant negative coefficient in the days preceding the announcement apart from BES. Concerning country outlook revision made by the rating agency Moody's I find that they are not significant as there is no evidence of significant abnormal returns on the days announcements were made. Also, in the days after the announcement no abnormal returns are significant. However, interestingly, there is evidence of anticipation in all securities. Such anticipation may thus explain the inexistence of abnormal returns in the day the announcement is made as the stock prices were already corrected downwards.

Moreover, taking into account outlook revisions at bank level, I find its immediate effects to be practically zero with the exception of BES and BPI, when the announcement comes from Standard & Poor's and Moody's respectively. There is no indication of market inefficiency and suggestions of anticipation are weak.

In sum, I find once again evidence that markets value more sovereign than individual ratings. An observation that strengthens the hypothesis mentioned before that banks' credit rating reviews have been reflecting changes in sovereign ratings rather than any idiosyncratic factors regarding banks' solvency.

In relation to lower part of Table 2 concerning downgrades the main findings are the following. Firstly, it is observable that downgrades by Standard & Poor's are not significant

across the board, the only exception being BES. Instead, they seem to be highly anticipated which might be on the root of no significance in the day of the announcement. Secondly, downgrades by Moody's and DBRS have affected banks' share prices broadly. For both rating agencies I find the degree of anticipation to be low.

Concerning market efficiency I find that the market adjusted slowly after announcements coming from Moody's whereas DBRS's announcements do not seem to cause a slow adjustment of stock prices the only exception being BPI. Finally, the rating agency Fitch has no impact whatsoever with exception of Banif. Regarding bank level downgrade I find that the only significant for BES are the announcements by DBRS, which means little as the newly appointed rating agency reviewed their credit rating for Portugal and BES simultaneously. Standard & Poor's affects both BCP and BPI and also for both, there is a certain degree of anticipation. Once again, Fitch has no significance for both banks to which it issues rating opinions (BCP and BPI).

**Table 3 - Regression Based Event Study - Outlook Revisions**

Country Level										
	S&P					Moody's				
	All	BES	BCP	BPI	Banif	All	BES	BCP	BPI	Banif
Significance	Yes	Yes	Yes	No	No	No	No	No	No	No
Market Inefficiency	Yes	Yes	Yes	No	Yes	No	No	No	No	No
Anticipation	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes
Bank Level										
Significance		Yes	No	No			No	No	Yes	
Market Inefficiency	NA	No	No	No	NA	NA	No	No	No	NA
Anticipation		No	Yes	No			No	Yes	No	
Downgrades										
Country Level										
	S&P					Moody's				
	All	BES	BCP	BPI	Banif	All	BES	BCP	BPI	Banif
Significance	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes
Market Inefficiency	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Anticipation	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes
Fitch										
DBRS										
Significance	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Market Inefficiency	No	No	No	No	Yes	No	No	No	Yes	No
Anticipation	No	No	No	No	Yes	No	Yes	No	No	No
Bank Level										
	BES			BCP			BPI			
	S&P	Moody's	DBRS	S&P	Moody's	Fitch	S&P	Moody's	Fitch	
Significance	No	No	Yes	Yes	No	No	Yes	No	No	
Market Inefficiency	No	Yes	No	No	No	No	No	No	No	
Anticipation	No	No	Yes	Yes	Yes	No	Yes	No	Yes	

Note: The classification of the event as significant is due based on the existence of significant negative abnormal returns (significant coefficient of the parameter associated with the dummy variable) on the day of the announcement and day after; the classification of market efficiency is due based on the existence of negative abnormal returns on the days after the announcement is made; the classification of anticipation is due based on the existence of negative abnormal returns on the days preceding the announcement

Source: Author's calculations.

#### 4. Conclusion

This paper assesses to what extent the European debt crisis have affected Portuguese banks. Firstly, I have made a comparative analysis between the performance of the banking industry and the performance of the broad index excluding the banking sector. Secondly, I have carried an event study analysis for the banks listed on the PSI20. The so-called events are supra company announcements issued by credit rating agencies, both of rating changes and outlook revisions from 2009 onwards. I analyzed the impact of announcements made by the relevant rating agencies – Standard & Poor's, Moody's, Fitch and DBRS.

From the first study I find that indeed, the banking industry has been severely impacted by this European sovereign debt crisis. The underperformance of the banking industry in relation to the remaining parts of the economy is overwhelming. Regarding the key results obtained with the event study they are essentially four-folded. Firstly, I find evidence that sovereign ratings are more important to banks' stock market performances than the actual bank level ratings. This finding may be associated with the fact that during this period, changes in banks' credit ratings have been reflecting changes in sovereign creditworthiness rather than any idiosyncratic factors of bank's solvency. Secondly, there is evidence that S&P is the predominant agency, seemingly because it generally anticipates its counter-parties in announcing analogous credit opinions. Thirdly, I find evidence that the market is not efficient in respect to this type of announcements. Finally, there are indications of anticipation to several announcements.

This study studies solely the particular impact that the European sovereign debt crisis has had in Portuguese banks. However, further research on the impact of a sovereign debt crisis to advanced economies in general is worthy of being carried out. Namely its impacts to the real economy not only in the short run but also in the long run. Moreover, I believe it would be interesting to carry out future research on the dynamics of banks' stock market returns after the results of sovereign debt auctions are made public.

## 5. References

- Fama, Eugene F., Lawrence Fisher, Michael Jensen, and Richard Roll. 1969. "The Adjustment of Stock Prices to New Information". *International Economic Review*, Volume 10: 1-21.
- Binder, John. 1998. "The Event Study Methodology Since 1969." *Kluwer Academic Publishers*.
- Ahern, Kenneth. 2009. "Sample Selection and Event Study Estimation." *Journal of Empirical Finance*, Volume 16: 466-482.
- MacKinlay, A. Craig. 1997. "Event Studies in Economics and Finance." *Journal of Economic Literature*, Volume XXXV: 13-39.
- Pynnönen, Seppo. 2005. "On Regression Based Event Study." *Acta Wasaensia*, No. 143: 327-354
- Borensztein, Eduardo et al. 2007. "Sovereign Ceilings "Lite"? The impact of Sovereign Ratings on Corporate Ratings in Emerging Market Economies." *IMF Working Paper*.
- Blundell-Wignall, Adrian and Patrick Slovik. 2011. "A Market Perspective on the European Sovereign Debt and Banking Crisis." *Financial Market Trends*, Volume 2010 – Issue 2.
- Davies, Michael. 2011. "The Rise of Sovereign Credit Risk: Implications for Financial Stability." *Bank for International Settlements Quarterly Review*, part 5, September 2011.
- IMF, September 2011. "Global Financial Stability Report – Grappling with Crisis Legacies." *World Economic and Financial Services*, IMF publication services.
- Bernanke, Ben. 1984. "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression." *The American Economic Review*, Volume 73: 257-276.
- Afonso, António., Davide Furceri, and Pedro Gome. 2011. "Sovereign Credit Ratings and Financial Market Linkages – Application to European Data." *ECB Working Paper Series*, No 1347.
- Banco de Portugal. 2011. "Relatório de Estabilidade Financeira." *Departamento de Estudos Económicos*.
- Hofmann, Thomas., Dr. Rolf Schneider. 2010. "Eurozone Debt Crisis: Impact on the Economy." *Economic Research & Corporate Development*, Working Paper 141.
- Panetta, Fabio., Ricardo Correa, Michael Davies, Antonio Di Cesare, José Marques, Francisco Nadal de Simone, Federico Signoretti, Cristina Vespro, Siret Vildo, Martin Wieland, and Andrea Zaghini. 2011. "The Impact of Sovereign Credit Risk on Bank Funding Conditions." *Committee on the Global Financial System Papers*, No 43
- Pollock, A. 2012. "Yet Another Sovereign Debt Crisis." *American Enterprise Institute*. March 16.
- Thomas Jr., L. 2011. "Pain Builds in Europe's Sovereign Debt Risk." *The New York Times*. July 17.
- Samuelson, Robert. 2011. "Europe's Banking Crisis." *Real Clear Politics*. September 16.
- Silva, M. 2012. "Financiamento à economia bate mínimos históricos". *Diário Económico*. April 10.
- Lehmann, Alexander. 2012. "A New 'Credit Crunch' in Emerging Europe?" *European Bank for Reconstruction and Development*. February 28.